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# TRANSMITTAL FORM

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| Filing Date | 8 February 2002 |
| First Named Inventor | Rodriques, Klein A. et al. |
| Art Unit | 1711 |
| Examiner Name | Asinovsky, Olga |
| Attorney Docket Number | 2002.ALC |

## ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
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- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
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- ☐ Drawing(s)
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Remarks

## SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

| | | | |
|---|---|---|---|
| Firm Name | National Starch and Chemical | | |
| Signature | | | |
| Printed name | David P. LeCroy | | |
| Date | 21 November 2005 | Reg. No. | 37,869 |

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**Mail Stop Appeal Brief - Patents**
Reply Brief Under 37 C.F.R. § 41.41

**PATENT APPLICATION**
Attorney Docket No. 2002

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | | | |
|---|---|---|---|
| **APPLICANTS:** | RODRIQUES, Klein A. *et al.* | | |
| **SERIAL NO.:** | 10/072 402 | **GROUP ART UNIT:** | 1711 |
| **FILED:** | 8 February 2002 | **EXAMINER:** | ASINOVSKY, Olga |
| **ENTITLED:** | HYDROPHOBE-AMINE GRAFT COPOLYMER | | |

CERTIFICATE of TRANSMISSION UNDER 37 C.F.R. § 1.8

I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office, by U.S. Mail, on **21 November 2005**.

Anne Marie Pickel

**Mail Stop Appeal Brief - Patents**
**Commissioner for Patents**
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## REPLY BRIEF UNDER 37 C.F.R. § 41.41

Dear Sir:

In response to the Examiner's Answer mailed from the Office on 21 September 2005, Appellants provide the following reply –

The Examiner states at p. 5 of her Answer that the "polyoxyethylene having hydroxyl end group is polyethylene glycol that is alcohol ethoxylate", and the "segment –(CH2-CH2-O)n-CH2-CH2-OH is readable as an alcohol ethoxylate." This is incorrect. From FORMULATING DETERGENTS AND PERSONAL CARE PRODUCTS: A GUIDE TO PRODUCT DEVELOPMENT, Chpt. 1, p. 23 (AOCS Press, Champaign, Illinois (2000)) (enclosed herewith as the Appendix), it is seen that alcohol ethoxylates have the chemical formula R-O-$(CH_2$-$CH_2O)_nH$, which is clearly different from the structure cited by the Examiner. Page 22 of the FORMULATING DETERGENTS reference illustrates the general formula for polyoxyethylene carboxylates as R-$(OCH_2$-$CH_2)$-O-$CH_2$-$COO^-$. Replacing the carboxyl functionality with a hydroxyl functionality results in the "polyoxyethylene having hydroxyl end group" referred to by the Examiner. Clearly this polyoxyethylene compound differs from the claimed alcohol ethoxylate.

Regarding claims 19 and 20 and the Examiner's assertion at p.7 of her Answer that it –

> would have been obvious to one of ordinary skill in the art to use a graft copolymer in Arfaei invention in the form of an aqueous coating composition wherein said coating composition comprises a desired active ingredient, and wherein a method of using said composition includes steps of coating, introducing said coating into an aqueous environment and control the pH value to the desired level. . . .

Applicants assert that the Examiner's Answer is improper and constitutes impermissible hindsight. Arfaei is directed towards plasticizing additives for use in hydraulic cement compositions (col. 1, lines 19-22). The additives function in reducing the amount of water used in such compositions, resulting in cement having higher compressive strength (col. 1, lines 33-47 and 11-18). Nowhere does Arfaei evenly remotely suggest the use of its additives as an encapsulant for active ingredients (see, *e.g.*, col. 6, line 60 – col. 7, line 53, particularly col. 7, lines 16-17). Therefore, one skilled in the art, having Arfaei before him, is provided no motivation to modify the teachings of Arfaei to make use of its plasticizing additives as an encapsulant for active ingredients. Rather, such 'motivation' can only be found by use of the present application as a template for such an invention. Such 'motivation' is improper and does not render the presently claimed invention obvious (see, *e.g.*, *In re Bond.* 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990); *SmithKline Diagnostics, Inc. v. Helena Laboratories Corp.*, 859 F.2d 878, 887, 8 USPQ2d 1468, 1475 (Fed. Cir. 1988), stating that a challenger to the validity of

a patent "has the burden to show some teachings or suggestions in the references to support their use in the particular claimed combination").

Regarding the Examiner's statements concerning the obviousness of claims 17 and 18, Applicants again assert that the Examiner is using impermissible hindsight, as Arfaei provides no suggestion or motivation for using its plasticizing additives for encapsulating, coating or associating with an active ingredient or substance. Therefore, the Examiner's rejection of this claim is improper and should not be sustained.

Likewise, claims 15 and 16 are directed towards treating a substrate with the copolymer of the present invention due to their affinity to substrates (see, p. 5, line 15 – p. 6, line 6 of the present description). In contrast, Arfaei only suggests the use of its plasticizing additives for reducing the amount of water in cement compositions. Arfaei does not teach or suggest that its additives will associate with a substrate. Therefore, Arfaei provides no motivation to treat substrates with its additives according to present claims 15 and 16.

For these reasons, as well as those reasons previously provided in Appellants' 5 July 2005 Appeal Brief and 8 July 2005 Supplement, it is respectfully submitted that the final rejection of all claims is untenable and should not be sustained. Allowance of the claims is believed to be in order, and such allowance is respectfully requested.

Respectfully submitted,

Dated: 21 November 2005

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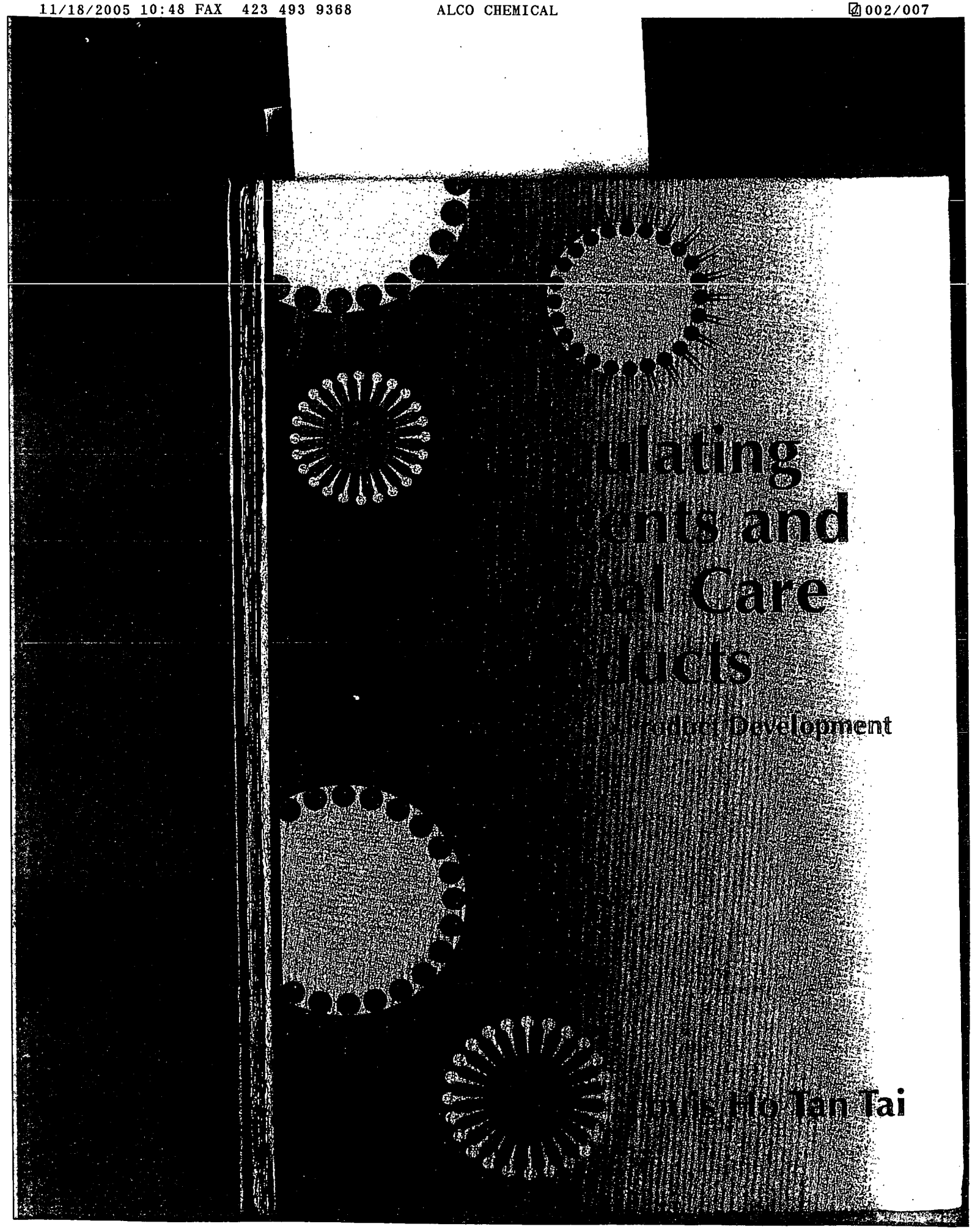
# APPENDIX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Product Development

# Formulating Detergents and Personal Care Products

## A Guide to Product Development

**Louis Ho Tan Tai**
Lambersart, France

AOCS PRESS
Champaign, Illinois

**AOCS Mission Statement**
To be a global forum to promote the exchange of ideas, information, and experience, to enhance personal excellence, and to provide high standards of quality among those with a professional interest in the science and technology of fats, oils, surfactants, and related materials.





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## ...ord to the English Edition

...first saw a translated version of this book, it immediately became clear ...

... and after an acceptable English text was dev...

...publications by AOCS Press.

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...t and personal care product develo...
...in the detergent area.
...the formulator—and one with superi...
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...ory as is needed to explain the "why" behind the ma...
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...stillation of a lifetime of experience by a creative and respe...
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...review.

...der should note that the book is written from a French perspective, w...
...aken from the French market and French legislation. It is stronger ...
...than on personal care products--hence the sequence of these subjects ...

...limitations are minor compared to the scope and breadth which the bo...
...The latter have inspired me to spend many hours on editing the origir...
...ion to make this book accessible to English-speaking readers.

*Arno Ca...*
*Arno Cahn Consulting Services, I...*
*Pearl River, New Yo...*
*May 20...*

The research highlights the main problems encountered by consumers. Thanks to research of this type, we know that on the whole, today's consumers are satisfied with the results they obtain but that certain stains continue to cause problems (ranked from the most resistant to the least difficult).

Consumer needs are also carefully monitored, thanks to this type of study. The problems encountered and consumer demands are the two indicators that help the formulator to develop products that truly reflect current consumer needs. This example based on clothes laundering is of course applicable to all other types of detergents for which similar surveys are conducted, i.e., dishwashing (hand and machine), personal care (soap, shower and bath products, shampoo), and other surfaces (bathrooms, floors, windows, modern surfaces).

## Reference

1. World Market Analysis, Unilever, September 1997.



# APTER 1

# The Main Surfactants Used i Detergents and Personal Car Products and Theories of Detergenc

## Surfactants and Their Process of Synthesis

### *ification of Surfactants*

factant molecule consists of two parts, a hydrophobic part (insoluble and a hydrophilic part (soluble in water). These molecules are highly acti interfaces between air and water or oil and water. They have a number including surface active agents, detergents, surfactants, or simply activ ur main classes of surfactants are: anionic, nonionic, cationic, and amph

*ionic Surfactants.* When the polar group, which is linked in a coval with the hydrophobic part of the surfactant, carries a negative charge (–CO $SO_4^-$) the surfactant is called anionic; soaps, alkylbenzenesulfonates, a ohol sulfates are all anionic active surface agents.

*ionic Surfactants.* When the polar group carries a positive char $R_3^+$), the surfactant is cationic; dimethyldistearyl ammonium chloride ple of this category.

*ionic Surfactants.* Nonionic surfactants have a polar group that can d in an aqueous solution. The hydrophobic part consists of the fatty cha rophilic part contains nonionizable atoms of oxygen, nitrogen, or sulf is obtained as a result of the formation of hydrogen bonds between wa es and certain functions of the hydrophilic part, for example, the et of the polyoxyethylene (hydration phenomenon). In this category we fi derivatives of polyoxyethylene or polyoxypropylene, but sugar esters a mides can also be included.

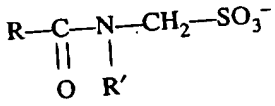
*photeric Surfactants.* Amphoteric surfactants are components wit e forming a dipolar ion. Cetylamino acetic acid, for example, produces owing forms in an aqueous environment:

$H_{33}$–$\overset{+}{N}H_2$–$CH_2$–COOH **cationic**, in an acid environment

$H_{33}$–NH–$CH_2$–$COO^-$ **anionic**, in a basic environment

In Europe, soap is used in detergents only as an antifoaming agent. It is also used in liquid detergents and soap-based shower gels. In developing countries, it is used for all-purpose products. Soap manufacturing processes are covered in detail in Chapter 12.

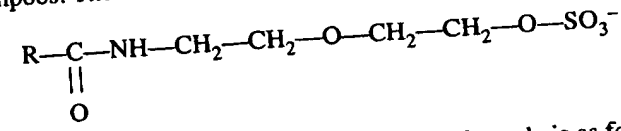
*Sulfoalkylamides of fatty acid* (N-*alkyl taurides)* have the following chemical formula:



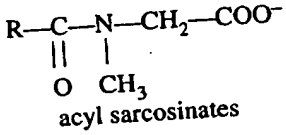
If $R' = CH_3 \rightarrow$ *N*-methyl tauride

The advantages of these products include foaming ability, lime soap-dispersing properties, and a feel similar to that of soap-based formulas.

*Diglycolamide sulfates* are not unstable in an aqueous solution and can be used in shampoos. The formula is as follows:



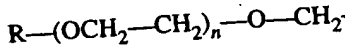
N-*Acyl amino acids* include acylsarcosinates; the formula is as follows:



acyl sarcosinates

The salts of *N*-acyl amino acids have good foaming and detergency properties. They are more soluble in hard water than soap and are not too aggressive on skin or hair. They give a soft feeling to hair and skin.

*Polyoxyethylene carboxylates* have the following chemical formula:



These derivatives have satisfactory detergency properties and the ability to disperse lime soap (the same properties as the *N*-acyl amino acid salts); when $n$ is high, they are compatible with cationics. They are easy to rinse off and are soluble at a low pH.

*Nonionics.* This group includes fatty alcohol polyethylene glycol ether or fatty alcohol ethoxylates, ethylene oxide and propylene oxide copolymers, amine oxides, alkylamines, alkanolamides, polyglycerol esters, alkyl polyglucosides, and fatty acid *N*-alkylglucosamides.

*Alcohol ethoxylates (AE)* have the following chemical formula:

$$R—O—(CH_2–CH_2O)_nH$$

fatty alcohol ethoxylate

Among commercial nonionics, those made from fatty alcohols with ethylene oxide are the most commonly used today. The basic chemical reaction used to change a fatty alcohol into a nonionic is the following:

$$ROH + n\,H_2C—CH_2 \longrightarrow R—O—(CH_2–CH_2O)_n–H$$

(O: ethylene oxide)

There are a number of processes for synthesizing fatty alcohol; the following are among the main ones:

(i) Primary alcohols. The chemical formulation is as follows:

$$R—CH_2—OH$$

primary alcohol

(ii) Natural alcohols. Natural fatty alcohols are produced from vegetable oils and fats. Although there are many processes to produce natural fatty alcohols, the most common is the reduction of either fatty acids or fatty esters according to the following equations:

$$R—C(=O)—OH + 2H_2 \longrightarrow R—CH_2OH + H_2O$$

$$R—C(=O)—OR' + 4Na + 2R''OH \longrightarrow R—CH_2ONa + R'ONa + 2R''ONa$$

ester; alcohol; alcoholate

$$\downarrow 4\,H_2O$$

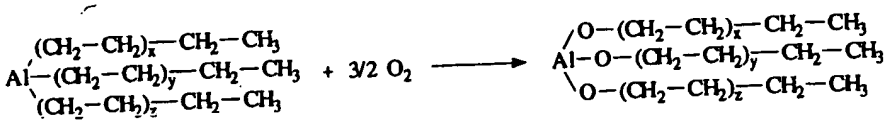
$$R—CH_2OH + R'OH + 2\,R''OH + 4\,NaOH$$

(iii) Synthetic alcohols. In the Ziegler process, the first stage is to react ethylene with a triethyl-aluminum to obtain an aluminum alkyl as follows:

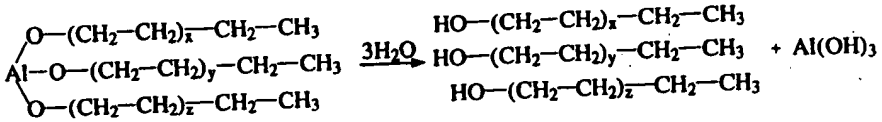
$$Al(CH_2–CH_3)_3 + n\,CH_2=CH_2 \longrightarrow Al[(CH_2–CH_2)_x–CH_2–CH_3][(CH_2–CH_2)_y–CH_2–CH_3][(CH_2–CH_2)_z–CH_2–CH_3]$$

$$x + y + z = n$$

The aluminum alkyl is then oxidized to give an aluminum alcoholate as follows:



The aluminum alcoholate is finally hydrolyzed in an acidic medium to produce the fatty alcohols.



A mixture of fatty alcohols is obtained with a Poisson distribution. The alcohols with a carbon chain between $C_{12}$ and $C_{20}$ are separated for use as detergent raw materials. It should be noted that alcohols obtained by the Ziegler method have an alkyl chain with an *even number* of carbon atoms, e.g., $C_{12}$-$C_{14}$-$C_{16}$-$C_{18}$-$C_{20}$.

In the OXO process, there are two main stages in the synthesis of fatty alcohols. In the first stage, a molecule of carbon monoxide and hydrogen and a molecule of olefin are combined according to the following reaction:

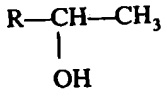
$$R—CH=CH_2 + CO + H_2 \rightarrow R—CH_2—CH_2—CHO$$

In the second stage, the aldehyde function is reduced to obtain fatty alcohol:

$$R—CH_2—CH_2—CHO + H_2 \rightarrow R—CH_2—CH_2—CH_2—OH$$

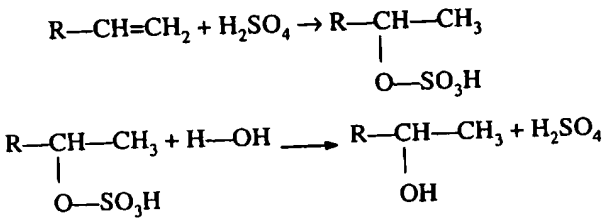
The alkyl chains of the alcohols can have an odd number or an even and odd number of carbon atoms (uneven, starting product = ethylene; even + uneven, starting product = olefin). Commercial products belonging to this class and regularly used in Europe are Dobanols (Shell), even and odd number of carbon atoms, and Synperonics (ICI), odd number of carbon atoms.

(iv) Secondary alcohols. The chemical formula is as follows:



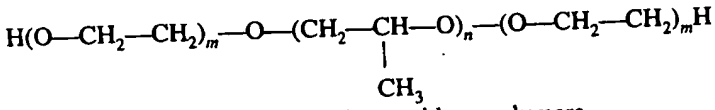
secondary alcohol

Considerable work has been reported on the preparation of secondary fatty alcohols—oxidation of paraffin, hydrogenation of paraffin and hydrolysis of halides, the addition of thioacetic acid to olefin, and hydrolysis and hydration of α-olefins. The hydration of α-olefin follows:



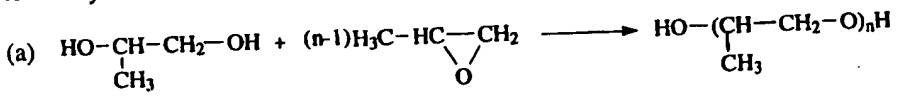
Secondary fatty alcohol ethoxylates sold in the industry are, for example, Tergitol 15-S-5 and 15-S-7 EO, respectively (Union Carbide).

*Ethylene oxide (EO) and propylene oxide (PO) copolymers (EO/PO adducts)* have the following chemical formula:



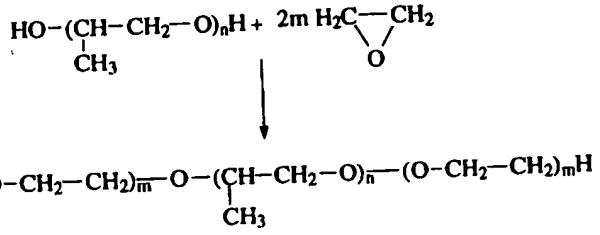
ethylene and propylene oxide copolymers

These are polyols obtained by adding propylene oxide to propylene glycol, followed by an addition of ethylene oxide, using the following scheme:



Propylene glycol Propylene oxide

(b)



In abbreviated form this is written as follows:

$$HO(OE)_m(OP)_n(OE)_mH$$

To obtain better alkaline stability, it is preferable to invert the addition as follows:

$$HO(OP)_m(OE)_n(OP)_mH$$

The ratio of EO to PO can vary between 4:1 and 9:1 with a minimum molecular weight of ~2000. These derivatives are used mainly in automatic dishwashing products